

THE
AGRICULTURAL MUSEUM:

OMNIS FERET OMNIA TELLUS. VIRG.

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For the Agricultural Museum.

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IRRIGATION, &c.

IN many situations the Farmer may derive great advantage from the judicious application of water to his lands. In order to decide, where, in what way, and to what degree, benefit may be expected, it will be of great use, to compare the different ways, in which water operates on land and vegetation.

1. Water sometimes promotes the growth of grass by its warmth. The protection from cold, and the warmth superior to that of the atmosphere, which spring water particularly affords, is the great cause of that verdure which marks the course of spring-runs early in the season. But no very great or permanent benefit can, it is believed, be derived from this operation of water. It may aid in producing early pasture or hasten a crop of grass. But as the spring advances, exclusive of other considerations, the earth receives more warmth from the warmed air and the sunshine than from the water.

2. Another obvious way, in which water, artificially applied, produces benefit, is, by increasing the moisture of the earth. How constant moisture may be and still promote vegetation, is evident in England and Ireland, where the almost perpetual humidity of the climate spreads a rich carpet of green velvet over a great portion of the country, and is exceedingly propitious to the culture of cabbages, turnips, &c. which are there crops

of very great importance. To what a high degree moisture may be carried, and still promote some species of vegetation, is evident from the luxuriance of our gardens, and from the great crops of hay and often of Indian corn, in seasons extremely wet. On the other hand, it is true, very great and long-continued moisture promotes the growth of wild, coarse, inferior grasses, in opposition to superior ones, and renders the same species of grass more flashy, less sweet and nourishing. This circumstance ought therefore to be kept in view. But, at the same time great benefit may be obtained from this operation of water, especially on ground naturally rather dry, or in dry seasons. In hot climates watering cultivated grounds is in some cases indispensable, in most cases it is highly beneficial. In this country, in seasons of drought, might not great advantage be derived from distributing water, where it can be commanded, in minute rills over fields of grain, particularly of Indian corn.

3. Some water produces great benefit by means of the sediment of an earthy nature which it deposits. This sediment consists of various earthy ingredients, according to the nature of the soil thro' which the waters flow. A great proportion of it is commonly fine sand, or light mould, brought down by the currents of rain water, or worn off from the banks of the stream itself. This sort of sediment is a source of fertility, by rendering the soil where it is deposited, mellow and moist, and also, because this light earth was formed originally, very much, of decayed vegetable matters, and partakes of the nature of a manure. The quality of sediment varies according to the size and swiftness of the stream, and the nature of the soils through which it runs. Swift streams, running over loose, rich soils, and streams apt to be suddenly swollen by rains, deposit the most sediment. Small streams of spring water, which are not much swollen by rains, and whose current is not rapid, and especially after they have run some distance over a grass sod, produces little or no benefit by sediment.

4. Some waters are very beneficial by means of the manure, or matters of a manuring nature, which they contain. Such are waters, which flowing along high-ways in time of rains, carry with them, in one shape or other, the manure which lies there. Such also are waters, which, flowing through, or passing by, large towns or cities, receive vast quantities of liquid, earthy or fossil, vegetable or animal matters, which highly impregnate them; and which are afterwards deposited in the soil, or which, being already in a state of dissolution and subtilty, go immediately with a portion of the waters, into the formation of vegetables.

5. Many waters are impregnated with limestone, chalk or other calcareous, enriching or stimulating matters, and thus become from this cause alone highly beneficial.

6. All waters, if long continued on one spot, will act by producing a dissolution of vegetable matters, in the soil, or on the surface, and, when the waters are taken off, the land will be thus rendered more productive.

The modes of applying water on meadow grounds, with which I am acquainted, are these two. 1. To raise the water by means of a dam, accompanied with a flood-gate, to such a height as to lay the surface of the land under water for a short space of time. In this case the flood will, if charged with sediment, deposit it, and also soak and saturate the soil with a moisture which will long remain and be highly beneficial. 2. The second mode is—To convey a stream, in a ditch, along the highest part of the ground you wish to water, and thence distribute it over the surface below, by means of small cuts in the sides of the ditch, at proper intervals, and where necessary, by subordinate channels, in such directions as the levels of the ground shall dictate. The waters of the first or highest ditch may, if the extent of land demands it, be caught in a second, and thence again distributed, and those from the second in a third. The secondary or

subordinate channels may in many cases be made with great expedition and sufficient perfection by the plough.

Where meadow is watered in this second mode, particular attention should be paid, not to let the water lie too long, at once, on any one spot. When the weather becomes warm in April and May, the water should be changed two or three times a week, and may be distributed successively over every portion of the meadow, from the highest part of the ditch to the lowest. If the water lie a greater length of time when the weather becomes warm, it may perhaps oppress the grass with too much moisture, it may tend to produce putrefaction in the vegetable; it at least forms a black scum or slime noxious to the grass.

There are a number of other important purposes besides that of irrigation to which Farmers may apply even the same stream of water. On the turn pike road, along the Mohawk river, in the State of New-York, it is a very common thing to see before a house a spouting pump, or hydrant, which supplies water for family purposes, and is accompanied by a trough, in which cattle and horses may be conveniently watered. In some instances, a lively stream from this pump descends across the road, and flows through the meadow. Col. Nicholas, at his farm near Geneva, has, as I have been told, a threshing machine which goes by water, and a grain-mill adjoining. The same stream on the same farm might often be made, and indeed often is made, to supply water for stock in different fields, to water meadow and to furnish a tannery, distillery, or some kind of labour-saving machinery or manufactory. Michaux, in his travels in the United States, mentions a farm, in a German settlement, in North Carolina, the owner of which had erected in his farm-yard, on the same stream, a good corn-mill, a saw mill, one for separating the seeds from cotton, a tannery, a tan mill, a distillery to make peach-brandy, and a small forge. It is highly probable, that the same stream admitted of being employed, and perhaps is employed by German industry and ingenuity

to supply a number of fields with watering places for stock, and to form a body of watered meadow.

I annex a few extracts from the Travels in France of that very distinguished Agriculturist, Arthur Young, who traversed that kingdom in various directions, in the years 1787, 1788 and 1789, with the view of carefully examining its agriculture.

"Limosin to Limoges.—Every spot of land in the mountains is watered that is possible; and with such attention as marks how sensible they are of the importance of this improvement."

"Gauge.—Coming out of this town I was surprized to find by far the greatest exertion in irrigation I have yet seen in France. A solid flank of timber and masonry is formed across a considerable river between two rocky mountains, to force the water into a very fine canal, in which it is, on an average, six feet broad by five feet deep, and half a mile long. A truly great work, equally well imagined and executed."

"Lille.—The road from Avignon hither passes, for some miles, through the dead level of the plain; the whole watered with great attention. The channels for conducting the streams, appear to be traced with much skill, and the distribution is to every crop at pleasure. Much of this land is under clover and lucerne, watered."

"Vaucluse.—The spring at this village, which will be for ever celebrated in the annals of love and poetry, ought not to be less so in those of cultivation. The waters are used within three or four hundred yards of the rock from which they burst, and with great effect."

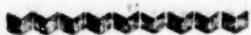
"Laurence—Leclere—For the whole way through these mountains, the exertions in watering are prodigious. There is not an inch capable of being irrigated over which water is not thrown, conducted on the slopes of the mountains every where possible."

"Beg de Rieux.—Every where watered that is practicable; and the bed of a river laid so dry from its water being taken for irrigations that it is curious to view."

"Campan.—Lands with water at command sell at about 50l. per acre, but not watered at about half that sum."

"The canals in the Milanese for mere irrigation are greater works than many in England for the purposes of navigation; and the infinite attention that is given to the perpetual deviation of the waters, is a spectacle of equal merit and curiosity."

A DISTANT SUBSCRIBER.



For the Agricultural Museum.



GARLIC—WILD GARLIC.

I have been asked so many times by my neighbours, How are we to get rid of garlic among our wheat? and I have heard the millers and purchasers complain more loudly about the garlic in wheat than any other quality or thing. I live myself in a country where garlic abounds, and being pretty much troubled with it on my own farm, and having sustained sometimes a very considerable deduction in the price at market, I have, Mr. Editor, for some time turned my attention very seriously to that troublesome thing, and I think I can at length, give your readers some information that will enable them to get rid of garlic in their wheat. What I have learnt is from my own experience and some recent experiment. A few years ago I prepared a field very well for wheat by ploughing it deep and pulverizing it well with the harrow; on one part I sowed two bushels to the acre, on the remainder I sowed only one. Where I sowed two bushels to the acre, the wheat in general was excellent; in some part of it where the land was not strong, there was a good deal of what we call underling wheat. Still the whole ground, all and every part and particle of the ground was covered with wheat,

and nothing but wheat; no sign of garlic or any pestiferous weed was to be seen. I am persuaded that the thickness of wheat destroyed the garlic; and I am positive that I made more wheat from the ground than could have been made by seeding thinner. Where I sowed only one bushel there was garlic as usual. I have an orchard that is now at this present time, June 18th, 1811, in wheat, and as full of garlic as it can be. Two years ago I fallowed it. I began in August, about the middle as well as I can remember, and after I had ploughed it over the first time, I did not cross plough it or stir the fallow for about three weeks; by that time there was a considerable growth of garlic, which was turned in with the second ploughing. I intended to sow immediately on the second ploughing and to harrow it in, which is my usual mode; but it so happened that I could not finish my other seeding for better than a fortnight; so that when I was ready and wished to seed the orchard, I found it covered with a second growth of garlic as long as my hand, it was very evident that it was not worth my while to seed on that ploughing. So I made my people plough it a third time and turn in this garlic again, and on that third ploughing, pretty late in seeding time, about the 15th of October, I sowed my wheat, and harrowed it in. There came from it a very pretty crop and not one head of garlic was to be seen. I fallowed that same orchard last fall again, but the ground was very hard in consequence of the long drought, and moreover, very much infested with blue grass, or as some called it, couch grass, which with the utmost pains I could not destroy by fallowing in the fall, for it grows as well from the sod, bottom upwards, as any other way, (at least in the fall of the year). Foul as the ground was, it was sowed. I may make my seed from it, but that is all; blue grass and garlic have almost entirely dispossessed the wheat. In a handsome lot alongside of this orchard, I have wheat also. The ground was extremely well prepared and sowed forward; but unfortunately my seedsman got laid up, and an awkward hand sowed

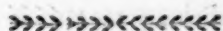
it very thin and very badly. It is very full of garlic. Some ground in the same enclosure which was sowed by my seedsman somewhat later and twice as thick has very little garlic, none to affect the price. Where thorough preparation, deep ploughing, complete harrowing, late seeding, and thick seeding, will not prevent or destroy the garlic, then let them use what I am now using very briskly, the *Garlic rake* or *Onion rake*, and that will take out by far the greater part. It ought to be made long enough to reach across a land or row of wheat, and have a handle at each end for two persons to carry, one walking in each furrow: when made accurately, it answers completely well; the teeth of the rake are set somewhat less than half an inch apart, which is sufficient to let the wheat go by and close enough to catch the garlic heads. I never used it before this year; indeed I never saw one before, and I am astonished considering how very perfectly they answer, that they have not long before this come into general use. It requires square true work; but any joiner could easily make one—the teeth are let in upon a straight square staff into jogs or places sawed and knocked out with a chisel, and then the whole are confined by a thin bit of plank nailed over them to the square staff, into which they are let in.

To conclude—From my experience above detailed, I find that garlic is a hardy annual bulbous plant, which has two modes of increasing: from offsets from the root and from the seedlings in the head. It flourishes most in cool moist seasons, and puts forth twice every year; the first crop late in February, March and April—the second crop late in August, September and October. By suffering your fallow or first ploughing for wheat to stand till the fall growth has attained some size, and by then turning them under they receive a considerable check; and then, if the ground is clean and well pulverized, the wheat has an opportunity to get the start of the garlic: and if there is enough wheat sowed to take up the whole nourishment or strength of the ground, the garlic will

succumb for that year, and the triumphant wheat will flourish and yield all that the soil is capable of making, clean and merchantable. Of all the things I ever tried, or ways I have fallen upon to extirpate garlic, I mean to rid the land of it completely, not for one season only, clover, deep ploughing and manuring are the most effectual means, but they will not do unless persevered in until your land is very rich. Sheep certainly lessen it. Pasturing judiciously with sheep, and never suffering it to seed, trench-ploughing, so as to bury deep the bulbs, and sowing the ground with winter and autumnal plants, which would grow so as to smother the garlic, might perhaps do. These things I shall try.

A ST. MARY'S FARMER.

June 18th, 1811.



For the Agricultural Museum.

ON THE CULTURE OF SILK.

Is it not surprising that the culture of silk which possesses such obvious advantages, should be so much neglected in the middle states, the climate and soil of which are better adapted to it than the more northern or southern parts of the Union. [The mulberry trees which grow spontaneously in Maryland and Virginia; if employed in feeding silk worms would yield a sum equal to the revenues of these states. The culture of silk has the following advantages:—It requires no capital; all the labour may be performed by those who are too feeble to labour in the field, the crop may be made in six weeks, the first twenty days of which require very little labour, and; above all, it pays better for the labour bestowed on it than any other species of manufacture.] Before the Revolution, Dr. Franklin and others attempted to introduce the culture of silk into Pennsylvania, and 126 persons were actually engaged in that business in Philadelphia when that city was invaded by the British, who cut down the mulberry trees, which, with the confusion ever inseparable from war, stopped its farther progress. In Con-

necticut, though the climate is evidently too cold for mulberry trees, large quantities of silk are raised, and mulberry orchards there yield the owner a handsome annuity. It appears, from the custom house books of that state, that 1000lbs. of raw silk were exported in the year 1796. Now if Dr. Franklin, whose wisdom and patriotism no one will doubt, thought the culture of silk of so much importance to Pennsylvania, when raw silk was worth but \$4.66 2-3 per lb: what ought we to think of it now the price is so much enhanced. In Spain, Portugal, and Italy, especially in the latter, the peasantry buy mulberry leaves, by weight, of the proprietors of trees, whose agents attend during the season for that purpose, by which means the poor have but a scanty pittance for their labour. In that part of Italy, called the Austrian Lombardy, (when subject to the house of Austria,) the leaves of a mulberry tree produced the owner, on an average, a half guinea; consequently, a few acres planted with mulberry trees, yielded the proprietor a considerable revenue, as the trees are planted at the distance of only a few feet. Something like this is practised in Connecticut, where mulberry orchards are rented for the purpose of feeding silk worms. In the mountainous parts of Syria, great profits are derived from mulberry trees, which are dwarfed and planted near together. If the shallow soil of Libanus, watered only by rills formed from the melting of snows, be found so advantageous, what might not we expect from the balmy air and deep soil of Virginia and Maryland?

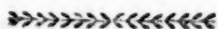
The culture of silk was unknown in Europe until after the Crusades, and was introduced into France so late as the reign of Henry the Fourth, by Sully, the favourite and minister of that king; and so rapid was the progress of the silk business in France, that in the reign of Louis the Fourteenth, the grandson of Henry the Fourth, there were 8000 silk looms and 800 silk mills in the city of Tours, and 18,000 looms in the city of Lyons. Though silk worms will live a few days on lettuce it is well known that the mulberry leaf is the only pro-

per food for them. The leaves of the white mulberry are the best; the tree is easily propagated, and possesses the property of enriching the soil. Excellent silk has been raised in the neighbourhood of Washington City, before the revolutionary war, from the leaves of the common black mulberry; and perhaps the superiority of the white mulberry consists only in its not being so easily injured by stripping off the leaves, and producing a second crop the same year.

To fit silk for sewing, for stockings, or for the loom, no other machinery than the common reel and little wheel is necessary. To feed and tend 50,000 silk worms, one boy or girl will be sufficient for the first week, two for the second, three for the third, and after perhaps it will take four. If plentifully fed, they will go to work in six weeks, and will then require no further trouble than to wind off the silk. This number, well fed, will produce 12 pounds of silk. In a pound there are 7008 grains; and if hanks of silk, of 32 grains each, be sold at ten cents a piece, which is lower than usual, it will amount to \$ 21 80 per pound. The sewing silk of the United States is preferable to that of Europe or Asia, their best silk being reserved for the loom, and that of an inferior quality converted into sewing silk. Nothing more easily takes dye than silk; and an ounce of good country made silk may be fairly rated at one dollar. Each worm spins a thread of about 350 yards in length, and, notwithstanding its fineness, will suspend a weight of more than an ounce; and the ounce weight, as spun by the worm, will extend in length 76,650 yards, which is upwards of 43 miles. The different transformations of the silk worm exhibit a lively image of the resurrection; and during the last stages of its existence, it lives on air only. Good crops of silk have been often raised in barns and tobacco houses; but it would be better to keep the worms in warm rooms. In Italy, the worms are kept in warm rooms, suspended on shelves, which may also be done here by the poorer classes, who may engage in that business. In Asia, silk worms are

placed on mulberry trees as soon as they are hatched, and left to themselves; and it is thought by some the same may be done here, with some caution against birds and insects. I have known silk worms put on a filbert tree, grow and make their balls without any trouble or care. The long spells of cold and rainy weather, which so frequently occur in the middle States in May, would however be an objection against this mode of cultivation. Dr. Franklin thought it practicable to raise two crops a year, as the hatching of the eggs may be retarded or accelerated at pleasure; but tho I concur with the Doctor, I can say nothing from experience. Would not the raising of silk worms be an excellent employment for the negroes of Maryland and Virginia, who are not capable of bearing the fatigues of the field. Mantua, Barcelona, Genoa, and the south of France, so famous for their silk manufactures, are some degrees more north than Virginia or Maryland, consequently not more favorable for the culture of silk.

PHILO SERICUS.



TO THE EDITOR OF THE AGRICULTURAL MUSEUM.

SIR,

Washington, 14th July, 1811.

In reading a letter of the Hon: Wm. Findley in your last Number of the Agricultural Museum, I perceive he wishes to know the manner in which potatoes are prepared for horses ; I therefore take the liberty of informing that gentleman, and others whom it may concern, how they are prepared in Liverpool, (England) for the Coal Merchants' Waggon Horses.

An iron pot of about 10 or 15 gallons is set over a furnace in the stable yard—the furnace and pot being sunk in the earth so deep that the brim of the pot is level with the surface of the ground—the furnace having a pit and inclined plain opposite its mouth, for the purpose of putting in fuel and taking away ashes. Over the pot is placed a cask of 100 or 150 gallons, having only one end in it, and that end perforated with augur holes—the cask is filled with potatoes, covered with a lid, and the lid cov-

ered with the sacks in which the potatoes are brought. In an hour after the fire is lighted, the potatoes will be completely boiled, by the steam rising from the water in the pot, and passing through the augur holes—when boiled, the cask is overturned, and the potatoes left to cool on the ground; when cool, conveyed to the stable, and I believe mixed with oats. The potatoes I saw boiled in this manner had all burst, looked like meal mixed with potatoes, and were for an establishment of 20 or 30 large horses, constantly employed in hauling waggons of coal from Wigan Canal to Liverpool harbour. It appears to me, that the same process, on a larger or smaller scale, may be adopted by any Farmer, to feed horses, cows, hogs and poultry.—An hour's labour, morning and evening, &c. and a few billets of wood would prepare a feed for all his stock.

I am, Sir, your's, &c.

JOHN GARDINER.



Hints regarding Cattle. By Sir John Sinclair.

FROM ESSAYS ON MISCELLANEOUS SUBJECTS.

The object that every intelligent farmer ought to have in view, who breeds and maintains domestic animals, is *profit*; consequently he ought to find out, as Bakewell happily expressed it, "*the best machine for converting herbage, and other food for animals into money.*"

For that purpose it is necessary to ascertain the shape and nature of the animal which makes the most profitable use of the food it eats: that, however, must depend much on the price of the different articles which the animal produces. For instance, the tallow formerly bore a higher price than meat, and consequently was a greater object in the breeding of cattle and sheep than at present, when it sells at an inferior price*, and the various arti-

* It would be a curious and important subject of inquiry, to endeavour to ascertain the real price, and the relative value, of beef, tallow, and leather, at different periods, more especially within the last century. It is evident, that the farmer must always aim at producing

cles produced from it have become so valuable as to render a good dairy-cow the most profitable of all our domestic animals, and consequently entitled to peculiar attention†. Meat, however, is at present the object most generally attended to; and it is certain that the breeding of cattle and sheep for the shambles was never carried to such perfection as it has lately been brought to in England.

The cause of this it may not be improper briefly to explain.

Stock, in general, (and this is still the case in a multitude of instances, and must always be so when the breeder has not food at command, calculated for fattening as well as rearing his cattle.) was formerly bred by one set of men, fattened or prepared for the market by

those articles which will yield him the greatest profit; and at present flesh must be the object; for my butcher informs me, that on the day on which this note is written, (25th January, 1802.) beef is sold at 9 1-2d. per lb. and tallow at 5 3-4d. per lb. or 3s. 11d. per stone. Flesh consequently is to tallow as 38 is to 23. It is therefore for the advantage of the farmer, as the market now stands, to produce flesh rather than tallow.

† It is much to be regretted that the real value of a good dairy-cow is not more generally known. I am assured, by a most respectable country gentleman, (Walter Trevelyan, Esq. of Nether Witton, in Northumberland,) that a well bred Teeswater cow will give, on an average, fourteen quarts at each of two milkings, or twenty eight quarts per day. Some of the Teeswater breed, according to Cully (page 40), give even to the amount of thirty-six quarts per day. But calculating at twenty-eight quarts, this, at 4d. per quart, amounts to 9s. 4d. per day, and in six months to 84l. Another intelligent gentleman, who has had great experience in cattle-farming, observes, that any cow, at all calculated for the dairy, will, in seven months milking, pay double her price to the butcher. Take, for example, an Irish or Scotch cow, calving in May, and value the grass she eats at 3l.; if she gives from ten to twelve quarts per day the farmer will not only be indemnified for attendance, rent, &c. but at the end of the season he will have the cow for nothing. Can there be a greater inducement to dairy-farming.

a second, and killed by a third*. Whilst these three occupations continued distinct, with only occasional communications or intercourse with each other, no great improvement could be effected. That division of labour; or separation of professions, so useful in manufactures, was pernicious to this important branch of agriculture, by preventing the principles on which the improvement of our domestic animals might be effected from being ascertained†.

A person, however, of strong natural sagacity, (Robert Bakewell, of Dishley, in the county of Leicester,) though he did not unite to the extent that his disciple, Culley, has done, the two distinct occupations of breeder and grazier, yet having acquired great skill in grazing, by preserving his breeding-stock in the highest possible condition, and having called in to his aid all the skill and experience which the butcher had acquired, was thus enabled to ascertain the principles, not only of breeding domestic animals, so as to answer the common expectations of the farmer, but also of bringing them to a degree of perfection, of which, before his time, they were scarcely supposed capable: and by directing the public attention in general, and that of the farmer in particular to the art of breeding, he has in various respects most essentially benefited his country. By his example that most important system was very generally established, of certain breeders directing their whole attention to the rearing of males, and letting them for the season, at such prices as would amply indemnify the breeder for all the care and expense he had bestowed upon them; a prac-

* The intermediate occupation of drovers, salesmen, &c. have no occasion to acquire any peculiar knowledge (excepting as to the state of the markets in various parts of the kingdom) different from that of the other professions above mentioned.

† But when the properties essential in forming a perfect breed are fully ascertained, the separation of occupations above alluded to will become useful, as one farm may be better calculated for breeding, another for fattening, &c.

tice which had originally taken place in Lincolnshire, but had never been carried to any great height till adopted by Mr. Bakewell.

In discussing the important subject of cattle, it is proper in the first place, to observe, that a distinct breed of cattle may be formed, 1, in consequence of the soil of the country, and the vegetables it produces; 2, from the climate, which, in various respects, must affect the animals living under its influence; 3, from a particular shape, size, or colour becoming fashionable, and consequently in great demand; 4, from the nature of the animals that may be imported into it from other countries; and, 5, from the various crosses which have been made among breeds in some respects distinct, and from which a new variety may arise.

It is not proposed, however, to attempt any particular enumeration of the various breeds in these kingdoms; for though differing in regard to colour, size, &c. they claim, in many respects, the same valuable properties.

The great object, therefore, to ascertain is, what particulars are essential to form a perfect breed; because, if these are once pointed out, there is no sort that may not be improved by attentive breeders; either by crossing with other stock, or by selecting the best specimens of the breed itself, so as to acquire the qualities that may be wished for. These particulars may be considered under the following general heads, namely. 1. Size. 2. Shape. 3. Disposition. 4. Hardiness. 5. Aptitude to feed. 6. Early maturity. 7. Milk. 8. Quality of flesh. 9. Fat. 10. Hide. And, lastly, Fitness for working.

Of the Particulars essential in forming a perfect breed.

1. *Size.* It is difficult to lay down any general rule for the size of cattle, as so much must depend on the nature of the pasture, and on the means which the grazier has for ultimately fattening them; nor has it yet been proved, by decisive and repeated experiments, whether the large or the small sized pay best for the food they eat.

The experiments ought to be made with similar breeds, but of different sizes, and the particulars to ascertain are, whether it does not require a much greater quantity of food, 1, to rear a great ox than a small one; 2, to feed him when working; and, 3, to fatten him afterwards. A large calf certainly requires more milk than a small one, but if it pays as well for what it consumes, or grows in proportion to what it takes, there is no objection, on that account, on the score of profit: nor if a large ox eats more, provided he works proportionally more than a small one. In regard to fattening, the experiments of Lord Egremont are rather favourable to the opinion, that fattening stock do not eat in proportion to their weight, but that a small ox, when kept in a stall will eat proportionally more, without fattening quicker than a large one.

Without pronouncing decisively on a question so much contested, as whether large or small cattle ought to be preferred, (which will require indeed a great number of experiments finally to determine,) I shall endeavour shortly to sum up the arguments made use of on either side.

In favour of small or moderate sized cattle, it is contended, 1. That a large animal requires proportionally more food than two smaller ones of the same weight. 2. That the meat of the large animal is not so fine grained, and consequently does not afford such delicate food. 3. That large animals are not so well calculated for general consumption as the moderate sized, particularly in hot weather. 4. That large animals graze pastures more than small ones. 5. That they are not so active, consequently not so fit for working. 6. That small cows, of the true dairy sort, give proportionally more milk than large ones. 7. That small oxen can be fattened with grass merely, whereas the large require to be stall fed, the expense of which exhausts the profit of the farmer. 8. That it is much easier to procure well shaped and kindly feeding stock of a small size than of a large one. 9. That small-sized cattle may be kept by many persons

who cannot afford either to purchase or to maintain large ones ; and, lastly, if any accident happens to a small-sized animal the loss is less material*.

In favour of the large-sized, it is on the other hand contended, 1. That without debating whether from their birth till they are slaughtered, the large or the small ox eats most for its size, yet that, on the whole, the large one will ultimately pay the farmer as well for the food it eats. 2. That though some large oxen are coarse-grained, yet that where attention is paid to the breed, the large ox is as delicate food as the small one. 3. That if the small-sized are better calculated for the consumption of private families, of villages, or of small towns, yet that the large ox is fitter for the markets of large towns, and in particular of the metropolis. 4. Even admitting that the flesh of the small-sized ox is better when eaten fresh, yet the meat of the large-sized is unquestionably better calculated for salting, a most essential object in a maritime and commercial country, for the thickest beef, as Culley (p. 47) justly remarks, by retaining its juices when salted, is the best calculated for long voyages. 5. That the hide of the large ox is of infinite consequence in various manufactures. 6. That where the pastures are good, cattle will increase in size, without any particular attention on the part of the breeder, which proves that large cattle are the proper stock for such pastures. 7. That the art of fattening cattle by oil-cake, &c. having been much improved and extended, the advantage thereof would be lost, unless large oxen were bred, as small ones can be fattened merely with grass and turnips. And, lastly, that large cattle are better calculated for working than small ones, two large ones being equal to four small ones, in the plough or the cart.

Such are the arguments generally made use of on both

* There is a number of important observations on the size of cattle in Dr Anderson's *Recreations*, vol. iii, p. 1 ; and, on the subject of the dairy, p. 161, 241, 321, 401, and vol. iv, p. 1 and 81. See the eighth volume of the first series of this work,

sides of the question ; from which it is evident that much must depend upon pasture, taste, markets, &c. But, on the whole, though the unthinking multitude may admire an enormous bullock, more resembling an elephant than an ox, yet the intelligent breeder (unless his pastures are of a nature peculiarly forcing) will naturally prefer a moderate size for the stock he rears ; or, perhaps, may adopt that plan of breeding, according to which the males are large and strong, and the females of a small size, yet not unproductive to the dairy*.

2. *Shape*† It is extremely desirable to bring the shape of cattle to as much perfection as possible ; at the same time profit and utility ought to be more attended to than mere beauty, which may please the eye but will not fill the pocket, and which, depending much upon caprice, must be often changing.

As to the shape of cattle, however, breeders seem to concur in regard to the following particulars, to wit, 1. That the form ought to be compact, so that no part of the animal should be disproportioned to the other. 2. That the carcase should be deep. 3. Broad. And, 4. That the head, the bones, and other parts of little value, should be as small as possible.

It is evident, however, that the form ought to be adapted, as much as possible, to the wishes of the consumer. For instance ; if cattle are to be sold in London, or in other places, where beef for rump-steaks is much in demand, and sells higher than any other part of the carcase, that is an object to be attended to in cattle bred for

* See Mr Knight's valuable account of the Herefordshire breed. Communications to the Board of Agriculture, vol. ii. p. 172. The Herefordshire, Devonshire, and Sussex, resemble each other much in this respect.

† It is a common saying with farmers, "*that all breed goes in at the mouth,*" and it is certain that no animals can be well shaped unless they are well fed, both in summer and winter. It is almost incredible how much the same breed will improve when they are better taken care of. That, however, ought neither to prevent selection, nor judicious crossing.

th Smithfield, or any similar market, which would not be essential in other counties where no such distinction is made in the meat that is consumed.

3 *Disposition*. It is of great importance to have a breed distinguished by a tame and docile disposition, without however being deficient in spirit. Such a breed is not so apt to injure itself, to break into other fields, &c; an unquestionably less food will rear, support, and fatten them. A tameness of disposition is much owing to the manner in which the animal is brought up, attention to inure them early to be familiar and docile cannot be too much recommended.

4 *Hardiness*. In the wilder and bleaker parts of the country, hardiness of constitution is a most important requisite; and, even where stock is best attended to, it is of essential consequence that they should be as little liable as possible to disease, or any hereditary distemper; as being *lyery*, or black-fleshed*, or having yellow fatt, and the like. It is a popular belief that a dark colour is an indication of hardiness; and that cattle with light colours are softer and more delicate. A rough pile is also reckoned a desirable property in a Highland breed; and above all, *in out winterers*, as they are called, or cattle kept out all winter, those who will face the storm, and not those who will shrink from it, are in request†.

5 *Easily maintained*. It is well known in the human race, that some individuals eat a great deal, and never get fatter; whilst others, with little food, grow immoderately corpulent. As the same takes place in regard to cattle and to other animals, it is evident how important it must be to ascertain the circumstances which produce

* Cully on Live Stock, second edition, p. 43. It is singular that these black-fleshed animals have little or no fat within or without.

† See Middleton's Mid-*Hesex*, p. 576.

‡ It is remarked in the Highlands, that in bad weather hardy cattle keep their back bones straight, whereas soft ones bend them. Hence the crooked appearance of bad cattle.

a property so peculiarly valuable in them. Bakewell strongly insisted on the advantage of small bones for that purpose; and the celebrated John Hunter declared, that small bones were generally attended with corpulence in all the various subjects he had an opportunity of examining. It is probable, however, that a tendency to fatten arises from some peculiar circumstance in the internal structure of the body, of which small bones are, in general, an indication; and that it is only in this point of view that they ought to be considered essential, for they often weigh as heavy, and consequently require as much nourishment as large ones. Small bones, like those of the blood horse, being compact and heavy: large bones, like those of the common dray or cart horse, being extremely porous, and consequently light for their apparent bulk. Indeed, cattle ought not only to be easily maintained, in point of quantity, but, in remote and uncultivated districts, in regard to the quality also of the food they consume; and it is certain, that some particular animals will fatten as well on coarse fare as others will do on the most luxuriant.

6. *Early maturity.* Arriving soon at perfection is a material object for the breeder, as his profit must in a great measure depend upon it. This is a circumstance indeed not only extremely material to the farmer, but in a populous country, where the consumption of meat is great, to the public also; as it evidently tends to furnish greater supplies to the market. In regard to this point, however, some wish to make a distinction between sheep and cattle; as the latter they affirm might pay for its keep by working or by milk. But is not the farmer indemnified for the expense of maintaining sheep by the valuable manure it yields, and the fleece which it annually produces, which, when manufactured, is the source of such profit to the community*.

* In regard to early maturity, both as to sheep and cattle, it evidently depends much on the animal being constantly kept in the best possible order, for if it is once suffered to fall back, it requires a considerable space of

ten from the touch of the skin. When its hide feels soft and silky, it strongly indicates a tendency in the animal to take on meat; and it is evident, that a fine and soft skin must be more pliable, and more easily stretched out to receive any extraordinary quantity of flesh, than a thick or tough one. At the same time, thick hides are of great importance in various manufactures. Indeed they are necessary in cold countries, where cattle are much exposed to the inclemency of the seasons; and in the best breed of Highland cattle, the skin is thick in proportion to their size, without being so tough as to be prejudicial to their capacity of fattening. It appears, from Columella's description of the best kind of ox, that the advantage of a soft skin is not a new discovery, but was perfectly well known to the husbandmen of ancient Italy.

Lastly, *Working*. It is a most important question, not yet finally ascertained, whether the public or the individual gain by working oxen*. In the infancy of agriculture, when husbandmen had inconsiderable capitals, and little work to do, it might be for their interest to use ox.

* It is ingeniously remarked, that the working of oxen must necessarily increase the number, and only suspend the consumption. In the survey of Northumberland, by Messrs. Bailey and Culley, some calculations will be found extremely unfavourable to the working of oxen. In fact, it is a general and complicated subject; as the question is not, whether oxen or horses can be worked at the least expense, but whether, by working horses, and feeding oxen, more butcher's meat will not be sent to the market? as oxen, when not worked, may be ready for consumption so much earlier than otherwise can possibly be effected. In favour of oxen, it is to be observed, that a ruminating animal will be served with one third less food than another of equal bulk, that does not possess that property. The reason is, that ruminating animals have stronger digestive organs, and every thing capable of being converted into chyme, or nourishment, is extracted from the food. But a horse's stomach is not fitted for this; so that a greater quantity of food is necessary to extract the same nourishment. See White on the Natural History of the Cow; Manchester Memoirs, vol. i. p. 462.

as they were cheaper to rear and to maintain, and would always fetch something. But the great farmers of modern times, who have large capitals to act upon, and constant occupation for their teams, will generally find it advisable, though they may employ oxen for some purposes, yet, on the whole, to make use of horses. At the same time, the population of a country may increase so much, that the ground must be cultivated, either by the hands of man, as in China, or by animals which man will eat; and the price of beef may become so high as to cast the balance in favour of oxen. On these grounds it is desirable, that the general breed of cattle in a country should be capable of working. Indeed, as stock ought to produce something, even when rising to their full growth, if oxen are not to be worked, cows ought to be more generally kept, as the produce of their milk is so profitable, unless where pasture is of little value, as in Wales, or the mountainous districts of Scotland and Ireland.

These short hints contain the substance of what has occurred to me on the principles of breeding cattle; and the result is, that cattle ought to be,

1. Of a moderate size, unless where the food is of a nature peculiarly forcing.

2. Of a shape the most likely to yield profit to the farmer.

3. Of a docile disposition, without being deficient in spirit.

4. Hardy, and not liable to disease.

5. Easily maintained, and on food not of a costly nature.

6. Arriving soon at maturity.

7. Producing considerable quantities of milk.

8. Having flesh of an excellent quality.

9. Having a tendency to take on fat.

10. Having a valuable hide. And,

Lastly, calculated (should it be judged necessary) for working.

I shall conclude with observing, how desirable it would be that, under the auspices of the Board of Agriculture, some person were appointed, perfectly competent to the task, and who had leisure to do justice to such an undertaking, to whose care and talents the important task might be committed of drawing up a detailed system on the subject of cattle. But in order to make such a work complete, more especially that part of it which relates to the diseases of cattle, it would be necessary to collect intelligence, not only from every district in these kingdoms, (which might easily be done, by circulating queries for that purpose, and granting premiums to those by whom the best answers were returned,) and also to extract useful information from the writings of Young, of Marshall, and of Anderson, and from the various publications of the Board of Agriculture, but to apply even to foreign countries for the knowledge they can furnish; and, with that view, it would be proper to carry on a regular correspondence with the most distinguished societies in foreign parts, who have directed their attention to rural improvements. By collecting the information and experience of the different countries in Europe upon that, and other subjects of a similar nature, there is every reason to hope that the art, not only of breeding and managing domestic animals, but also every other branch of agriculture, might be brought to a degree of perfection, which otherwise must be unattainable.



Columbian Agricultural Society.

At a Meeting of the Standing Committee of the Columbian Agricultural Society, at the Union Tavern in Georgetown, on Saturday the 13th of July, A. D. 1811, it was determined that the following Premiums, in Plate with suitable devices, be given at the General Meeting of the Society, to be held on the third Wednesday in November next, viz.

Premium I.—Forty Dollars.

For the best Bull as to form and size, ago considered

not less than one year, nor more than four grasses old.

Premium 2.—Thirty Dollars.

For the best Heifer as to form and size, age considered, not less than one year, nor more than three grasses old.

Premium 3. Thirty Dollars.

For the best fat Bullock or spayed Heifer, for beef.

Premium 4.—Thirty Dollars.

For the best yoke of draft Oxen, broke to work single or double.

Premium 5.—Twenty Dollars.

For the best written Essay on the mode of geering and working Oxen, founded on actual experiments.

Premium 6.—Thirty Dollars.

For the best piece of fullled and dressed woolen cloth, of any width, not less than seven square yards.

Premium 7.—Twenty Dollars.

For the best piece of woolen Kerseymere, not less than ten yards in length.

Premium 8.—Twenty Dollars.

For the best piece of cloth, cotton warp filled with wool, to shew the wool on one side, not less than ten yards.

Premium 9.—Twenty Dollars.

For the best piece of fancy patterns for Vests, of wool and cotton, not less than ten yards.

Premium 10.—Twenty Dollars.

For the best piece of Flannel, all wool, not less than ten yards.

Premium 11.—Fifteen Dollars.

For the best piece of Flannel, part cotton, part wool, not less than ten yards.

Premium 12.—Ten Dollars.

For the best pair of fine woolen stockings, knit or woven, full size.

Premium 13.—Twenty Dollars.

For the best pair of fine woollen blankets, large size.

Premium 14.—Ten Dollars.

For the best pair of stout coarse blankets, for laborers, full size

Premium 15.—Ten Dollars.

For the best parcel of flaxen or hempen sewing thread, made up of three qualities, of at least half a pound each, viz.

One of strong brown, and white brown, two sizes.

One of coloured, of one size, various colours; size and colours as commonly used for family purposes.

And one white, of various sizes, from coarse to fine,

Premium 16 — Thirty Dollars.

For the best woollen carpet or carpetting, in the piece, containing not less than thirty square yards.

The Society reserves to itself the power of withholding any Premium, where the animal or article of manufacture exhibited, is not deemed sufficiently valuable to merit reward.

Resolved, That in future one year's subscription of Ten Dollars shall be deducted from all premiums exceeding 25 Dollars, payable to persons not members of the society.

Reasonable proof will be required of compliance with the 9th and 10th General Rules of the Society, viz.

No person shall be allowed to exhibit any Article for Premium which has not been raised, grown or made in some County of this District, or of the adjoining States, in which there shall reside at least one Member of this Society, or any Article for which a public Premium shall have previously been given.

No Premium shall be given for any Articles of Manufacture, which have not been either spun or woven in the families from which they may be exhibited, and which have not been both spun and woven in this District or the adjoining States.

It being the principal object of the Society, in regard to Manufactures, to encourage those properly called Domestic, It has been *Resolved* by the Standing Com-

The object of this letter is to inform you
 nagement that a friend of mine pursues in **MUSEUM:**
 seed wheat. It is his invariable practice
 wheat two or three times in clean water
 and skimming off all the light grain. **V.S. VIRG.**
 washed, it is pickled with urine, and
 lime after the common method. **Tust, 1811. [No. 2]**
 been long in the practice of sowing
 ver had any loss from disease *sinduseum*.

above mentioned mode of preparation
 formed me, that he seldom **OVER**
 wheat; while his neighbor and 80th queries of the
 practice, of the *Agri- mucus Society*, published in No.

Washington Agricultural Museum. The queries are
 whom I had

of it. If the best rotation of crops in which Indian corn,
 ful mangel and clover are included.

a practice Is there any ameliorating crop that can be culti-

I do between a corn and a wheat crop with advantage.
 diseases² A rotation of crops in which annual leguminous
 ed sets follow Indian corn and precede wheat.

25. Is there any leguminous crop that can be cultivat-
 to advantage upon a large scale in a rotation of crop.

"80. The best mode of extirpating the wild garlic and
 ther troublesome weeds."

In answering the first query the others are answered.

The best rotation of crops in which Indian corn, wheat
 and clover are included, are the following, to wit:
corn and turnips, oats, clover, wheat. Let the turnips be
 sown in August, among the corn, upon clean ground, and
 the seed lightly harrowed in or rolled in; and in the
 winter fed off with sheep, cattle or hogs, but sheep in
 preference. Let the residue of the turnips left after the
 winter feeding, be ploughed in in the spring, and the oats
 sowed early when the ground is in the best order for
 ploughing. With the oats sow clover seed, and let the
 clover the following year in August be fallowed, (if
 completely taken) with one ploughing only, taking care
 to turn the sod over completely throughout the field; on

Caspian Wheat be formed of a single arch, much wider than the former, and of a mode of constructing stone or wooden bridges, of sufficient strength to stretch over most narrow rivers, where bridges are required, without the aid of piers, and will not need an inconveniently high arch, to its height, although its ex-

I hope these several grains, over their size and fulness, and climates within the range I have sent them, from Massachusetts to Virginia, may prove congenial to which case we shall find them a valuable acquisition to our agriculture.

JOEL BARLOV

NOTE. The grain above described, has been separated into small parcels, as requested by Mr. Barlow, and sent to the Members of the Standing Committee of the Columbian Agricultural Society, to be cultivated under their direction or the direction of such of the "Agricultural Members," as they may deem proper. EDITOR.

From the Farmer's Magazine.

ON WASHING WHEAT.

Sir—Perhaps no agricultural subject has been more agitated of late than the diseases incident to wheat. When we consider the importance of this crop to the farmer, and the loss which is often occasioned by diseases to which the grain is exposed, it is indeed evident we cannot prosecute the subject with too much attention. It seems to be a prevalent opinion that pickling wheat tends to preserve the grain free from diseases, or cure it when infected; and long experience testifies that it is of ad-